Wind Energy

2010 Zoning Ordinance Amendments

Planning Commission Work Session

June 15, 2010

Dealing with Wind Energy in the Zoning Ordinance

- Article II - Definitions
- Article III – District Regulations
- Article IV - Use and Design Standards
  - Wind Energy Systems, Small
  - Wind Energy Systems, Large / Utility
  - Windmill
  - Accessory Uses and Structures

Types of Wind Energy Systems

- **<u>Wind Energy System, Small</u>***:* A wind energy conversion system designed to supplement other electricity sources as an **accessory** use to existing buildings or facilities, wherein the power generated is used for **onsite consumption**.

  A small wind energy system consists of a single wind turbine, a tower, and associated control or conversion electronics, having a rated name plate capacity of not more than **50 kilowatts** (kW) for residential uses and not more than **100 kilowatts** (kW) for other uses.

  For the purpose of residential net metering, Virginia Code §56-594B limits the electrical generating facility to a capacity of not more than **10 kilowatt**s (kW) and **500 kilowatts** (kW) business/ commercial.

Corolla Landscaping - Currituck County, NC

Photo Courtesy of Megan Cronise

Types of Wind Energy Systems

- **<u>Wind Energy System, Large</u>***:* A wind energy conversion system used primarily to generate energy for **on-site use** consisting of one or more turbines, towers, and associated controls or conversion electronics, having a rated nameplate capacity of **not more than 999 kilowatts (kW)**.

  For the purpose of net metering, Virginia Code §56-594B limits the electrical generating facility to a capacity of not more than **500 kilowatts (kW)**.

Types of Wind Energy Systems

- **<u>Wind Energy System, Utility-scale</u>***:* A wind energy conversion system usually used to generate energy for sale to off-site users consisting of **more than one turbine,** which has a rated name plate capacity of more than **1 MW or greater**.

  The system is not limited to storage, electrical collection and supply equipment, service and access roads, and transformers.

Types of Wind Energy Systems

- **Windmill**: A machine designed to convert the energy of the wind into more useful forms of energy using rotating blades to turn mechanical equipment to do physical work, without producing energy.

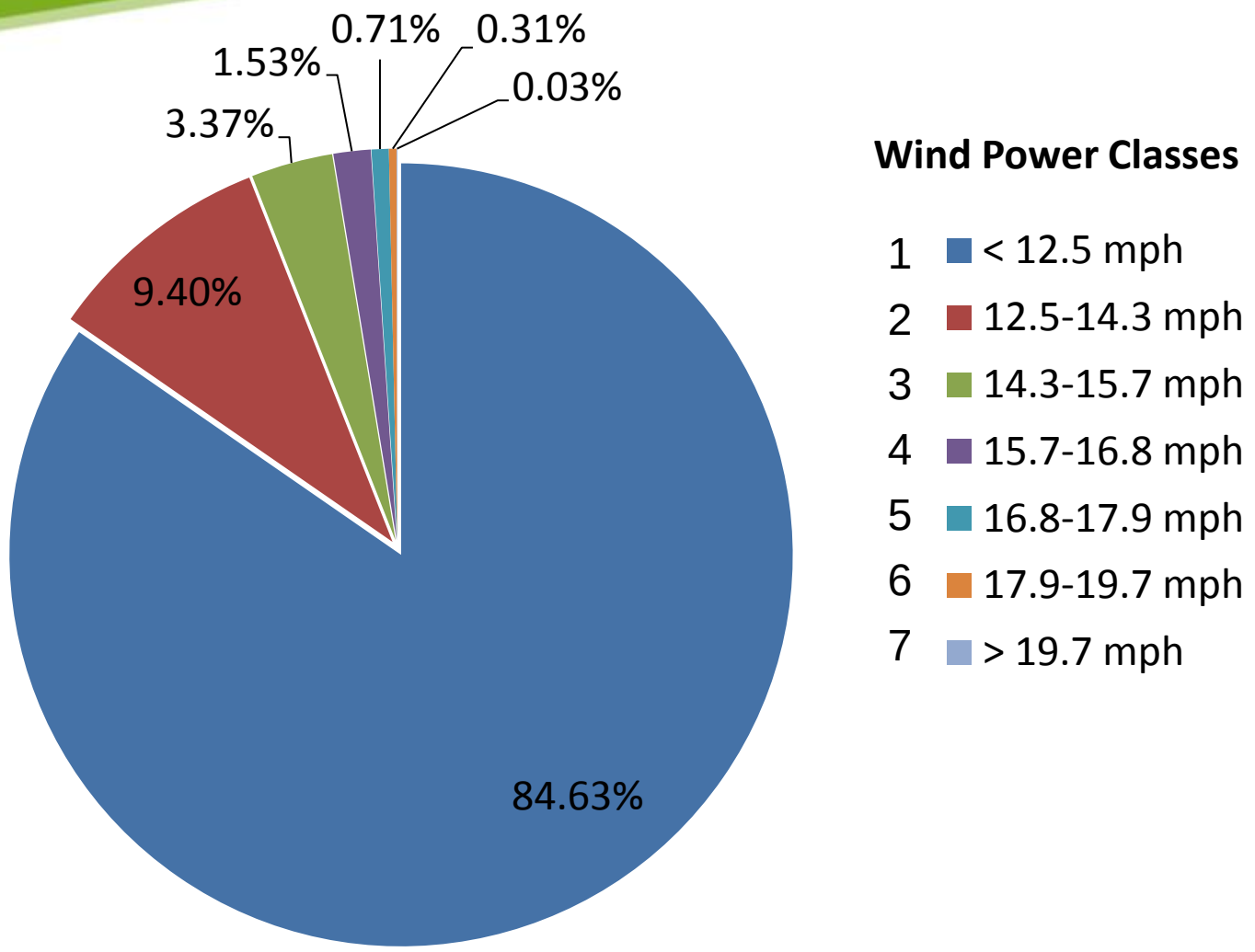
  Windmills are **no greater than 60 feet** in height and are operated by the wind usually acting on oblique vanes or sails that radiate from a horizontal shaft. Wind mills, as defined, are **not regulated as small wind energy systems**. Possible uses would be a wind-driven water pump or electric generator.

Scale of Wind Energy Systems

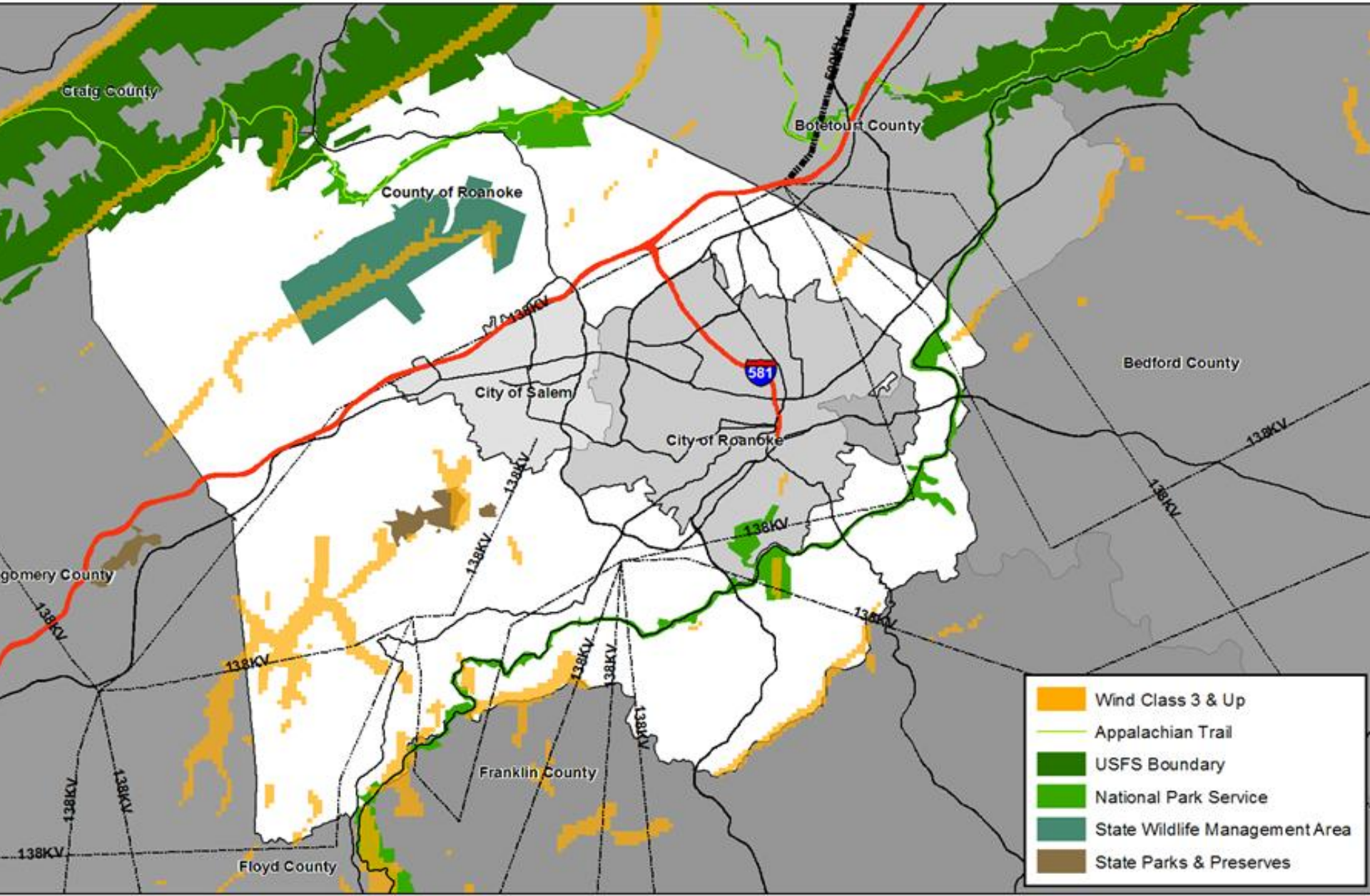
Wind Class	Potential For Wind Development
Class 1 or 2	▪ Marginal for onsite ▪ Unsuitable to marginal for community-scale ▪ Unsuitable for utility-scale
Class 3	▪ Appropriate for onsite ▪ Marginal to appropriate for community-scale ▪ Unsuitable for utility-scale
Class 4	▪ Appropriate for onsite or community-scale ▪ Marginal for utility-scale
Class 5+	▪ Appropriate for all scales

Source: Virginia renewables Siting Scoring Systems (VrS^3)

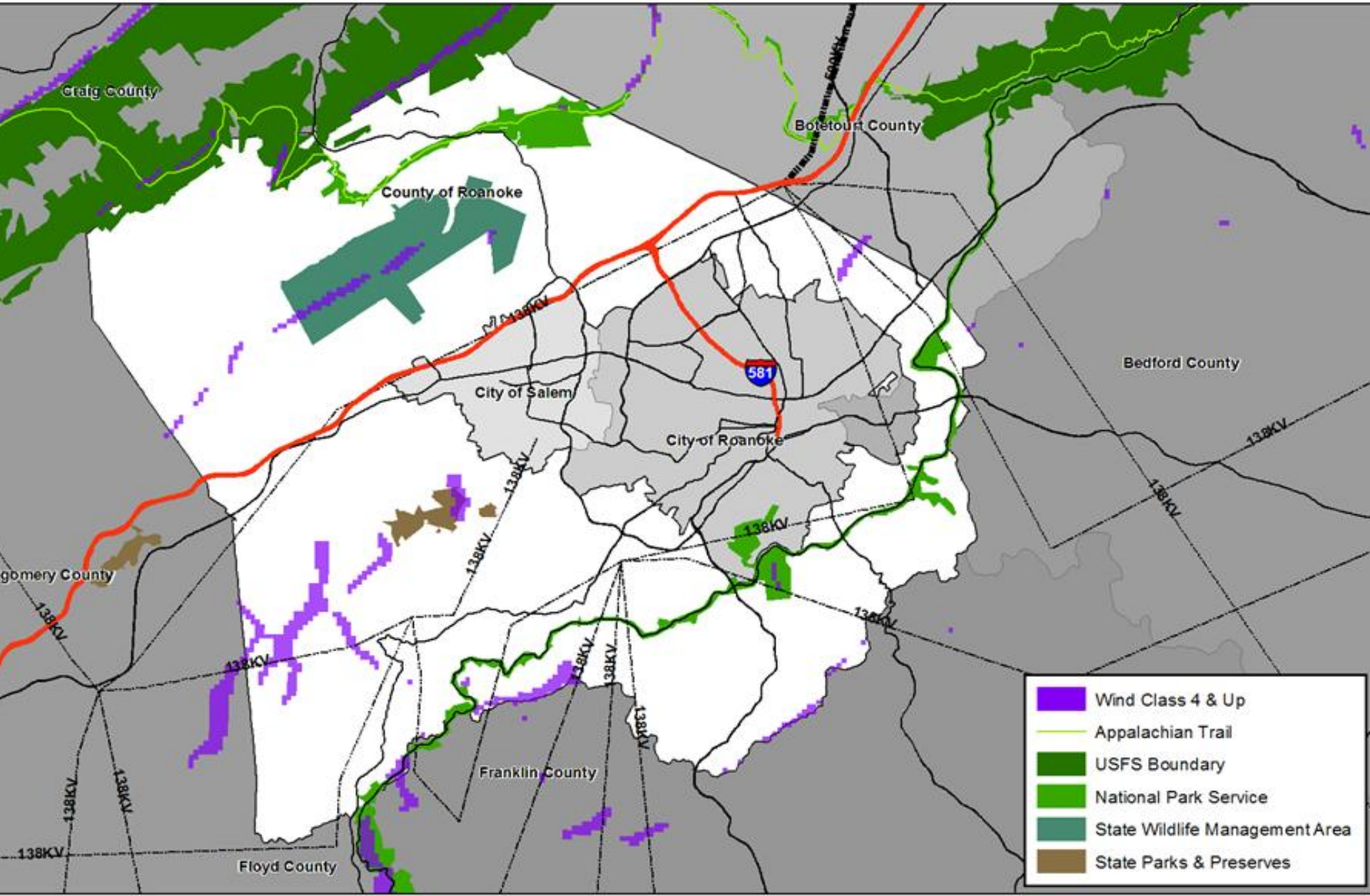
Wind Distribution in Roanoke County



Large Scale Energy Systems (Class 3±)



Utility Scale Energy Systems (Class 4±)



Article III – District Regulations

TYPE OF SYSTEM	AG-3	AG-1	AR	AV	R-1	R-2	R-3	R-4	PRD	NC	C-1	C-2	PCD	I-1	I-2	PTD	EP
Small	R*	R*	R*	R*	R*	R*	R*	R*	R*					R*	R*	R*	R*
Large / Utility	S*	S*												S*	S*	S*	
Windmill	R*	R*															

R – Use by Right
S – Special Use Permit
* - Use and Design Standards

Use and Design Standards

- Height / Lot Size Requirement
  - Graduated Scale
- Setback – What is the purpose of the setback?
  - Fall Zone Protection – homes, roads, properties?
  - Noise Abatement?
  - 100% or 40% (broadcast towers, amateur radio towers)
  - Zoning Administrator flexibility

Use and Design Standards

- Noise
  - dB level requirement for Small Systems
  - Issues with enforcement
  - Large / Utility scale – handled through SUP process
- General Standards vs. Zoning District Standards
- Other Issues?

Types of Wind Energy Systems

- **<u>Wind Monitoring Meteorological Tower</u>**: A **temporary** tower equipped with devices to measure wind speeds and direction, used to determine how much wind power a site can be expected to generate.

Use and Design Standards – Accessory Uses

- Commonly Found and Associated with Principal Use Types
- Appropriate and Incidental to the Principal Use
- Accessory Use Types
  - Agricultural
  - Residential
  - Commercial
  - Civic
  - Office
  - Commercial
  - Industrial

Accessory Uses

- **<u>Wind Energy System, Micro Wind System</u>** *(Building Integrated):* A building-mounted wind energy conversion system that has a manufacturer's rating of **10 kW or less** and projects no more than **fifteen (15) feet** above the highest point on the roof and shall not be considered a small wind energy system in terms of area and setback requirements.

Questions, Comments, Concerns?